

REMARKS/ARGUMENTS

Summary of Office Action

Claims 1 through 21 are currently pending in the present application. Claim 21 is a new claim. The Examiner has rejected claim 1 under 35 U.S.C. §102, as allegedly anticipated by a publication, "Applications of Low-Density Parity-Check Codes to Magnetic Recording Channels," IEEE Journal on Selected Areas in Communications, Vol. 19, No. 5 (May 2001), written by Song et al. (hereafter called "Song"). Additionally, the Examiner has rejected claims 2 to 6 as allegedly obvious under 35 U.S.C. § 103(a), based on Song and another publication, "Reduced-Complexity Decoding of Low Density Parity Check Codes for Generalized Partial Response Channels," IEEE Transactions on Magnetics, Vol. 37, No. 2 (March 2001), written by Mittelholzer et al. (hereafter called "Mittelholzer"). The Examiner has objected to claims 7 to 12, as being dependent upon a rejected base claim, but has stated that they would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. The Examiner has objected to claims 13 to 18 as allegedly failing to comply with the enablement requirement of 35 U.S.C. §112, first paragraph. Finally, the Examiner has allowed claims 19 and 20.

Amendments to Claims

The original claims included three independent claims: 1, 13, and the allowed claim 19. Applicant has amended claim 1 to include the limitation in allowed claim 19 as to a tone detector in the decoder. Applicant has amended claim 13 to: (a) use the means-plus-function language necessary to invoke the sixth paragraph of 35 U.S.C. §112; (b) describe the claimed decoder as a combination of at least two elements, namely, a bits-to-checks device and checks-to-bits device; and (c) include the limitations with respect to a low-density, parity-check (LDPC) matrix included in original claims 4 and 7.

Additionally, Applicant has amended claim 7 as suggested by Examiner's objection, so that it is in independent form and includes all of the limitations of its original base claim 4. See MPEP 608.01(n)(V). Consequently, Applicant believes that claim 7 is now allowable, without further amendment or argument, as are the claim's dependent claims, 8 through 12. Applicant has amended claim 5 to correct a typographical error and claims 1-12 to use the term "apparatus" instead of "system". Finally on this point, Applicant has added a new claim 21 which includes the functional elements shown in Figure 3, a comprehensive diagram of Applicant's channel-processing apparatus. Here see generally, MPEP 706(I).

Enablement Rejection and Amendments to Claim 13

As noted above, the Examiner has rejected independent claim 13, and its dependent claims 14 to 18, on the basis of the enablement requirement in 35 U.S.C. §112, first paragraph. In making this rejection, the Examiner stated:

"...The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim is drawn to a single means and the statute requires that the enabling disclosure of the specification be commensurate in scope with the claim under consideration."

Applicant interprets this rejection as falling under MPEP 2164.08(a) (concerning unduly broad claims to a "single means"), since the Examiner did not identify the subject matter that is considered to be enabled, as is required by the last sentence of MPEP 2164.08, or explain why the specification is not enabling, as is required by MPEP 706.03(c) (see especially the "Scope of Enablement" form paragraph, ¶ 7.31.03).

Based on that interpretation, Applicant has amended claim 13 so that the decoder there claimed now includes a combination of two elements, rather than merely one: (a) a bits-to-checks device (see Figure 7 and paragraph [0053] of the specification); and (b) a checks-to-bits device (see Figure 8 and paragraph [0054] of the specification). More specifically, claim 13 now includes “means for performing a bits-to-checks computation, wherein the means further comprise a bits-to-check device” and “means for performing a check-to-bits computation, wherein the means further comprises a checks-to-bits device”. Further, as just shown, claim 13 now describes those two elements using means-plus-function language, which was absent from the original claim. Therefore according to the decision in *In re Hyatt*, 708 F.2d 712 (Fed. Cir. 1983), the claim is no longer unduly broad, if it ever was. As the *Hyatt* court explained, with reference to 35 USC §112:

The final paragraph of §112 saves *combination* claims drafted using means-plus-function format from this problem by providing a construction of that format narrow enough to avoid the problem of undue breadth as forbidden by the first paragraph. But no provision saves a claim drafted in means-plus-function format which is not drawn to a combination, i.e., a single means claim.

708 F.2d at 715 (emphasis in original).

Further on this point, Applicant points out what might be obvious. Claims 13 to 18 (as amended, if not in their original form), pertain to a subcombination, namely an LDPC decoder, in a larger combination, namely, a channel-processing apparatus, which also includes a tone detector, a sync detector, and a number of other elements. Applicant believes that his LDPC decoder has separate utility apart from the channel-processing apparatus, which is why Applicant has presented claims 13-18. Here see generally MPEP 806.5(c). Applicant believes that the application's specification provides more than ample disclosure to enable one skilled in the pertinent art to make and use his LDPC decoder, as claimed, without undue experimentation. See MPEP 2164.01. Indeed, the

Examiner has admitted as much by conditionally allowing claims 7-12, which include the LDPC decoder.

Finally here, Applicant notes again that the amendments to claim 13 now also include substantive changes, i.e., the limitations as to the LDPC matrix that were included in original claims 4 and 7. In particular, claim 13 now states that its checks-to-bits functionality “determines the minimum-entry for a particular row of a low-density parity check matrix, and further determines the second-minimum-entry in the same particular row, and wherein the low-density parity check matrix has a size of 272 rows by 4624 columns.” The Examiner has indicated that claim 7, and its dependent claims, would be allowable if rewritten to include claim 4. Consequently, Applicant believes that independent claim 13 should now be allowable, as should its dependent claims.

Anticipation Rejection

With regard to an anticipation rejection, the governing legal and administrative principles are clear. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), as cited in MPEP 2131. As noted above, the Examiner made an anticipation rejection to claim 1, citing Song as the single prior art reference.

In response to this rejection, Applicant has amended claim 1 so that it includes the limitation in allowed claim 19 as to a tone detector in the decoder. As stated in the amendment, the channel-processing apparatus includes “a tone detector operative to detect a frequency in at least one tone field and provide framing information to a partial response signaling device”. Song nowhere teaches this limitation, nor does the other prior art cited by the Examiner. Indeed, when allowing independent claim 19 and its dependent claim 20, the Examiner noted the novelty in a decoder with “a tone detector that detects a frequency in at least one tone field”.

New Claim 21

Finally in this regard, Applicant reminds the Examiner that he has added a new claim 21 that includes the functional elements shown in Figure 3, including the tone detector and the sync detector. Applicant asserts that neither Song nor the other prior art teaches the latter two elements, as evidenced by the Examiner's allowance of independent claim 19 and dependent claim 20.

Obviousness Rejections

The Examiner also alleges that original claims 2 to 6 are obvious, based on Song and Mittelholzer. Here again, the governing legal and administrative principles are clear. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), as cited in MPEP 2143.

Focusing for the present on the third requirement for a *prima facie* case of obviousness, the Examiner must show that the combined references teach or suggest all of the claim limitations in claims 2 to 6. The five claims at issue ultimately depend upon independent claim 1. But as noted above, Applicant has amended that claim to include a limitation as to a tone detector, which limitation is not taught by Song. Nor is it taught by Mittelholzer. Consequently, the third requirement for a *prima facie* case of obviousness is not met and the obviousness rejections fail.

In light of the foregoing, Applicant believes that all currently pending claims are

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presently in condition for allowance. Applicant respectfully request a timely Notice of Allowance be issued in this case. If the Examiner believes that any further action by Applicant is necessary to place this application in condition for allowance, Applicant requests a telephone conference with the undersigned at the telephone number set forth below.

Date: October 20, 2006
Customer Number: 30505
Law Office of Mark J. Spolyar
2200 Cesar Chavez St, Suite 8
San Francisco, CA 94124
415-826-7966
415-480-1780 fax

Respectfully Submitted,
LAW OFFICE OF MARK J. SPOLYAR
By

/Mark J. Spolyar/
Mark J. Spolyar
Reg. No. 42,164